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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/619,241	07/14/2003	Devendra S. Chhabra	HTIRC02-012	5834

7590 08/26/2004
STEPHEN B. ACKERMAN
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EXAMINER

LEPISTO, RYAN A

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/619,241

Applicant(s)

CHHABRA ET AL.

Examiner

Ryan Lepisto

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-55 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because:

- in Figure 7 the word “waveguide” has some script written over it making the word hard to read.
- any figure that is prior art (“common” – page 7) should be labeled accordingly.

See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering

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of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action.

Specification

2. The disclosure is objected to because of the following informalities:
 - The statements of "Not to be considered prior art for the purposes of the present invention" on pages 6, 7 and any other place in the specification should be removed. This is not a valid or appropriate statement for applications.
 - If a figure is a "common" initial structure (page 7) and is prior art is should be labeled so in the specification and drawings.
 - Lines should be labeled throughout the specification, they are omitted currently.
 - In claims 1,20 and 38 the paragraphs starting with, "partially into the underclad..." should not be indented under "patterning:".
 - Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. **Claims 1-3, 6, 10-13, 16-18, 20-22, 25, 29-31, 34-36, 39-40, 46-49 and 52-54**

are rejected under 35 U.S.C. 102(e) as being anticipated by **Won et al (US 6,542,687)**.

4. With regard to claims **1, 6, 20, 25 and 38**: Won et al teaches (Figures 3-5) a method of forming a waveguide, comprising the steps of: providing a structure (300, 400, 500); forming an underclad layer (312, 412, 512) over the structure (300, 400, 500); the underclad layer (312, 412, 512) having a width; forming a core layer (310, 410, 510) over the underclad layer (312, 412, 512); and patterning: the core layer (310, 410, 510) to form the waveguide; and partially into the underclad layer (312, 412, 512) about one-half of it's width (Figures 3-5), forming an overetched underclad layer (312, 412, 512) having a projection underneath the waveguide; the waveguide having stress gradients and the overetched underclad layer having stress gradients (see column 6 first paragraph for example stresses).

5. With regard to **claims 2-3, 12-13, 21-22, 30-31, 39-40 and 48-49**: Won et al teaches the method described in action 3, wherein the structure (300, 400, 500) is comprised of silicon oxide (column 4 line 65), the underclad (312, 412, 512) layer is comprised of silicon dioxide (column 4 line 64); and the core layer (310, 410, 510) is comprised of doped silicon dioxide (column 4 line 66). It is also inherent that the overclad layer (514) consists of silica to match the underclad layer (312, 412, 512) (column 5 lines 58-60). All layers comprise silica as mentioned above. All layers however do not consist only of silica. This meets the mentions claim limitations though.

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6. With regard to **claims 10 and 46**: Won et al teaches the method described in action 3, including the step of forming an overclad layer (514) over the waveguide and the overetched underclad layer (312, 412, 512).
7. With regard to **claims 11, 29 and 47**: Won et al teaches the method described in action 3, including the step of forming an overclad layer (514) over the waveguide and the overetched underclad layer (312, 412, 512); the overclad layer (514) being comprised of a material that optically matches the underclad layer (312, 412, 512).
8. With regard to **claims 18, 36 and 54**: Won et al teaches the method described in action 3, wherein the polarization sensitivity of the waveguide is reduced (column 5 lines 15-17).
9. With regard to **claims 16-17, 34-35 and 52-53**: Won et al does not teach expressly the overetching of the underclad layer lowering the stress gradients from the waveguide into the projection of the overetched underclad layer and the stress-induced birefringence of the waveguide being reduced.

Won et al does teach the overetching of the underclad layer.

It is inherent that overetching of the underclad layer would lower the stress gradients from the waveguide into the projection of the overetched underclad layer and the stress-induced birefringence of the waveguide. Won et al teaches that this overetching minimizes polarization dependent wavelength shift/polarization dependent loss (column 3 lines 42-45), which is a result of lower stress gradients from the waveguide into the projection of the overetched underclad layer and stress-induced birefringence.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. **Claims 4-5, 7-9, 14-17, 19, 23-24, 26-28, 32-35, 37, 41-45, 50-53 and 55** are rejected under 35 U.S.C. 103(a) as being unpatentable over Won et al.

11. With regard to **claims 4-5, 7-9, 14-15, 23-24, 26-28, 32-33, 41-42, 43-45 and 50-51**: Won et al teaches the limitations described above.

Won et al does not teach expressly all example dimensions for the substrate or core, underclad and overclad layers.

Won et al does teach the core layer for the one example as having a thickness of 6.0 microns and a width of 8.0 microns (column 6 lines 10-11), and overetch thickness of 0.5-2.0 μm (column 6 lines 17-19). Won et al also teaches a preferable overetching range of between 7.5-30% where the percentage is calculated by $((\text{etched depth from the surface}) - (\text{core layer thickness}) / (\text{core layer thickness}))$. Therefore, it would be obvious to modify these variables as long as the overetching range still is within the taught range.

At the time of the invention, it would have been also been obvious to a person of ordinary skill in the art to modify Won et al and all of the dimensions of the waveguide

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and its layers to any range that is obvious to one skill in the art (including structure thickness of 0.20-1.50 mm, underclad layer thickness of 5.00-25.00 μm and width of 6.00 μm , overetched width of 3.00 μm , waveguide width of 6.00 μm , and overclad thickness of 0.50-6.00 μm) to determine and test the correct amount of overetch for a given fabrication process and a given planar lightwave circuit (column 6 lines 22-29).

The motivation for doing so would have been to reduce polarization dependent wavelength shift/polarization dependent loss of planar lightwave circuits (column 1 lines 10-14).

12. With regard to **claims 19, 37 and 55**: Won et al teaches the limitations described above.

Won et al does not teach expressly the coefficient of thermal expansion for the substrate and the core layers being different.

Won et al does teach that many different sets of variables (e.g. coefficient of thermal expansion, blanket stress, percent over-etch, and the like) can be examined in order to determine the correct amount of over-etch for a given fabrication process and a given planar lightwave circuit (column 6 lines 24-28). Won et al also teaches different composition for the substrate and core layer (substrate – silicon (column 6 line 12) and core – doped silicon dioxide glass (column 4 line 66)).

At the time of the invention, it would have been also been obvious to a person of ordinary skill in the art that different materials with different coefficients of thermal expansion may be used as long as the polarization dependent losses are reduced by reducing stress gradients.

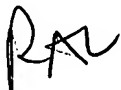
The motivation for doing so would have been to reduce polarization dependent wavelength shift/polarization dependent loss of planar lightwave circuits (column 1 lines 10-14).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Lepisto whose telephone number is (571) 272-1946. The examiner can normally be reached on M-F 7:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ryan Lepisto

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Date: 8/23/04



Frank Font

Supervisory Patent Examiner

Technology Center 2800